This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

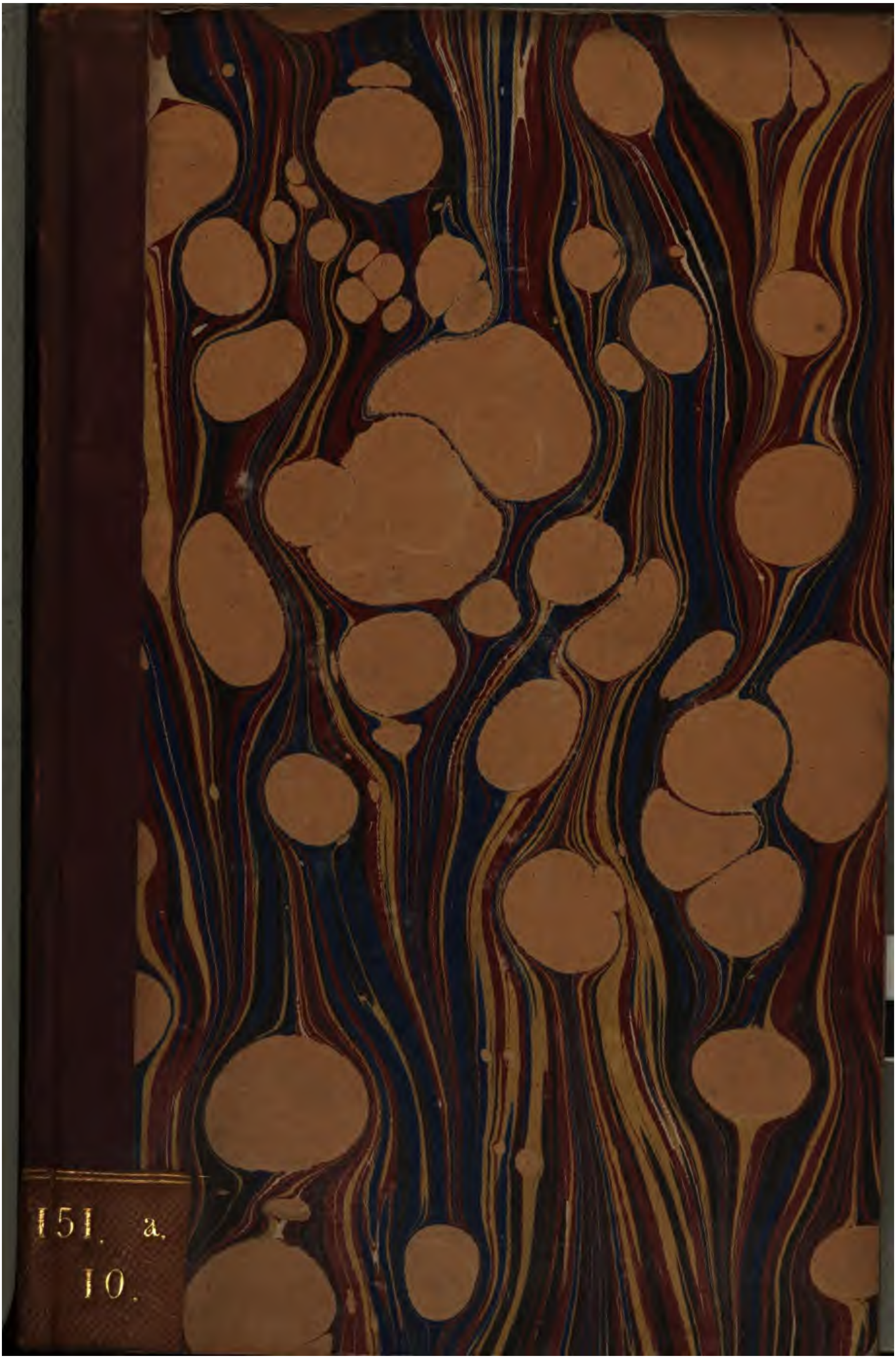
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`



151. a.
10.

FOUL AIR AND FEVER,

AS

CAUSE AND EFFECT,

EXEMPLIFIED IN THE SANITARY CONDITION OF BEDFORD,

BY T. HERBERT BARKER, M.D., (LOND.).
Fellow of the Royal College of Surgeons; Fellow of the Royal Medical and Chirurgical Society of London, &c.

> "To preserve health is a moral and religious duty. For health is the basis of all social virtues. We can be useful no longer than we are well."—DR. JOHNSON.

LONDON:
HAMILTON, ADAMS, AND CO., PATERNOSTER ROW.
BEDFORD: JOHN G. NALL, HIGH STREET.

1854.

151. a. 10.

BIBLIOTHECA·BODLEI
DOMI NUS ILLU

> "The Maker of the universe has established certain laws for the planet in which we live, and the weal or woe of mankind depends upon the observance or the neglect of those laws. One of those laws connects health with the absence of those gaseous exhalations which proceed from over crowded human beings, or from decomposed substances (whether animal or vegetable); and these same laws render sickness the almost inevitable consequence of exposure to those noxious influences. But it has, at the same time, pleased Providence to place it within the power of man to make such arrangements as will prevent or disperse such exhalations, so as to render them harmless, and it is the duty of man to attend to those laws of nature, and to exert the faculties which Providence has thus given to man for his own welfare."—*Letter from Lord Palmerston's Private Secretary to the Presbytery of Edinburgh.*

INTRODUCTORY.

During the last sixteen years one thousand four hundred and forty seven (1447) deaths from typhus-fever, small-pox, and a few other preventible diseases, have occurred in Bedford and the villages within five miles of the town. According to this ratio, there must be nine thousand and forty three (9043) deaths from preventible causes in a century. In describing diseases, such as typhus-fever, small-pox, &c., as *preventible by human agency*, we claim for sanitary regulations and precautions no greater efficacy than can be proved by indisputable facts that they possess. Of the world of facts which might serve as examples let us quote one.—Even the hardy Italian peasants who toil in the pestilential marshes—the *Campagnia di Roma*—know that, if they remain exposed to the deadly air during the summer, they must sicken, and probably die, of fever, and, therefore, seek shelter in Rome and other cities, where they may be seen, during the nights of summer, sleeping in the porticos and colonnades of churches and palaces. This is an extreme but, nevertheless, a fair example of the effects of *malaria*, or, in plain English, "*bad air*." A polluted atmosphere is a poison taken into the lungs, as diluted prussic acid is a poison taken into the stomach. As death by poison is certainly preventible by human means in the latter case, so it is in the former, simply by cleansing the polluted atmosphere, or by removing ourselves from its contact. A neighbourhood, though not so deadly as the Pontine marshes, may have such an amount of malaria, that persons residing in it may be far more exposed to death by fever than in healthier districts, and, therefore, the redundancy of deaths by fever in such a neighbourhood may be fairly classed with "preventible deaths." These observations would hardly have been required, had not a mistaken piety, in some cases, opposed itself to beneficent schemes for the decrease of mortality, regarding them as human invasions on the domain of Divine Providence. Rational piety understands that it is an essential part of the plan of Divine Providence to leave human life *partly* dependent on human agency.

To realize the import of the fact, that so many preventible deaths occur in our town and neighbourhood, let us imagine it as modified with regard to time. Let us suppose the case of fourteen hundred lives suddenly destroyed by the escape of some noisome gas in some particular neighbourhood in Bedford. How great would be our regret for such a calamity! How prompt our measures to prevent its recurrence! But though the fact is made *less striking* by taking place, not suddenly, but *gradually* during a number of years, it remains essentially the same fact—that upwards of fourteen hundred persons have died during sixteen years, by breathing unwholesome air in the town of Bedford and its immediate neighbourhood.

With these few introductory remarks, I now invite the attention of my fellow-townsmen to a summary of the *statistics* of mortality in Bedford, followed by some observations on the *causes* of preventible diseases, and on the *remedies* required to improve the sanitary condition of our town. Whatever judgment may be passed on my suggestions of sanitary reforms, I am confident on one point, that the *facts* I have to state will demand the attention of all who care for the welfare of Bedford.

"The investigations which have been conducted within the last twenty years into the causes of epidemic diseases have resulted in the most satisfactory demonstration of the truth, that, whatever may be their moral causes, they are traceable to conditions which are subject to human control, and that they disappear as those conditions are removed. Leaving it to others to interpret these pestilential scourges on higher principles, the writer of the following papers has endeavoured to prove that the mission of this destroying angel is to show the connection between physical impurity and deadly disease, and to summon individuals and governments to the grand work of sanitary reformation."—Laws of Cholera reprinted from "the Times."

FACTS AND FIGURES.

DURING the seven years ending June 30th, 1853, there died, of the population of Bedford, including all its five parishes, and excluding the deaths in the public institutions of persons not belonging to Bedford, 1710 persons, or 244 per annum. This gives 22.6 as the average number of deaths per thousand in Bedford, during the last seven years, or 1 in every 44 of the living. The deaths in Bedford during the last seven years, *including* all the deaths in the public institutions, were 2205, which would give us a mortality of 29 per thousand, or 1 in every 34 or 35 of the living. If the deaths of persons not belonging to the town, in our public institutions, were included in all our calculations, we should follow the plan adopted by the Registrar-General in ascertaining the mortality of other towns; but the fact must be borne in mind, that, in all our statements of mortality in Bedford, the deaths in our public institutions—the County Asylum, the Infirmary, the Workhouse, and the Gaol—of persons not belonging to Bedford, have been deducted; and that the deaths of persons in these institutions, belonging to Bedford, have been carried to the totals of their respective parishes. Our statistics have been made more complicated by these calculations, but, through the kindness of gentlemen connected with the Asylum, Infirmary, &c., the precise data have been obtained; so that our results may be depended on for correctness. It must not be forgotten by the reader that these calculations make the difference in the rate of mortality in favour of Bedford, which there is between 29 per thousand and 22.6 per thousand, or 1 death to 44 living and 1 death to 34 or 35 living.

Taking, then, the ratio of mortality of the borough of Bedford at 22.6 per thousand, let us compare this result with the average mortality in several districts in Northumberland, Devonshire, North and South Wales, Gloucestershire, Kent, and Middlesex, where the ratio is only 14 or 15 per thousand per annum, and we shall, at once, see reason for further inquiry. As contrasted with the healthier districts in England, the sanitary character of Bedford appears in the ratio:—As 23 is greater than 14 or 15, so the likelihood of death in Bedford is greater than in districts in Northumberland, Devonshire and other counties. Or, in inverse ratio, as 23 is greater than 14 or 15, so the *chances of life* in Bedford are proportionately *less*.

As it may be thought that this is an extreme contrast, let us take as examples some villages in our own neighbourhood, where the average mortality ranges only from 15 to 16, 16 to 17, 17 to 18, per thousand; and this fact will surely be sufficient to shew the necessity of inquiry. We now proceed to details.

The mortality in the five parishes in Bedford is very unequal: taking the average of sixteen years, St. John's is the most healthy parish (18.4 per thousand, or 1 death to 54 living); St. Cuthbert's is the most unhealthy (25.9 per thousand, or 1 death to 39 living); St. Paul's, the most populous parish, (23.2 per thousand, or 1 death to 43 living, or taking the average of only the last *seven years*, 24.2 per thousand, or 1 death to 41 living); St. Mary's parish, 20.0 per thousand, or 1 death to 50 living (for the 16 years); and St. Peter's parish, for the same time, 20.0 per thousand, or 1 death to 50 living. The respective populations of the five parishes in the year 1851 will be seen in the following Table:

TABLE I.

	Population in 1851.	Mortality ⅌ thousand during 16 years.	Mortality ⅌ thousand during 7 years.
St. Paul............	6707	23.2 or 1 in 43 living	24.2 1 in 41 living
St. Peter	2198	20.0 1 in 50	18.0 1 in 55
St. Mary	1670	20.0 1 in 50	19.1 1 in 52
St. Cuthbert........	663	25.9 1 in 39	26.2 1 in 38
St. John	453	18.4 1 in 54	22.2 1 in 45
Total..........	11691	22.3	22.6

Let us compare with this the mortality of a few of the healthiest parishes in the Bedford Union. Of the 39 rural parishes there are 14 the mortality of which is 19 or under 19 per thousand, namely:—

TABLE II.

PARISH.	Proportion of Living to Deaths.	Mortality ⅌ thousand
Biddenham............................	18.3	1 in 55
Bolnhurst	18.6	1 .. 54
Bromham	18.3	1 .. 55
Eastcotts............................	16.8	1 .. 59
Goldington............................	19.0	1 .. 52
Knotting............................	15.4	1 .. 65
Melchbourne	16.0	1 .. 63
Milton Ernest............................	18.9	1 .. 53
Odell	18.3	1 .. 55
Renhold	18.9	1 .. 53
Sharnbrook............................	18.3	1 .. 55
Souldrop	16.8	1 .. 59
Willington	18.5	1 .. 54
Wilshamstead............................	18.1	1 .. 51

Now, if the mortality of Bedford could only be reduced to the average mortality (17 per thousand) of six of the healthiest of these parishes, the annual number of deaths in Bedford would be 161 instead of 218, and *there would be an annual saving of* 57 *lives in our town!*

Still more remarkable will be the comparison with the healthiest parishes in England. MR. LEE in his "Summary of Experience in Diseases and Comparative Rates of Mortality," shows that in certain healthy districts, including county towns, villages, and hamlets, with an aggregate population of 100,000, the average mortality per annum was only *eleven* in the thousand; that is to say, of 600,000 persons, only 6,600 died in a year; whereas, if the mortality had been equal to that of Bedford, or 23 per thousand, instead of 6,600 there must have been 13,800 deaths. We may fairly assume that among the 6,600, many deaths from preventible causes were reckoned (for these, everywhere, form a considerable item in the totals of mortality); and therefore, the mortality of Bedford shows an excess over that of the best regulated populations in a ratio of 23 to 11, or rather more than double.

If the mortality of Bedford were not higher than that of the healthiest places in England, (11 per thousand), the annual number of deaths would be 104 instead of 218, and *there would be an annual saving of* 114 *lives in our town!*

In the sixteen years over which our calculations extend, there would have been a saving of 1824 *lives in the five parishes alone of Bedford, if the town had been one of the healthiest in this country. During the same period there would have been a saving of* 912 *lives if the town had been as healthy as* 14 *of the rural parishes in the district of the Bedford Union.*

It is a fact that there are districts in England where the people, on the whole, are *twice* as healthy as we are. Where *one* person dies in these superior districts, at least *two* die in Bedford. Surely this is a fact demanding our serious attention!

We learn from the admirable reports of the Registrar-General that the annual mortality of all England and Wales is in the proportion of 1 death to every living 45 persons. The following Table shows the comparative mortality of our own country and other European States:—

TABLE III.

STATES.	Year.	Mortality ⅌ thousand.	Living to one Death.
England	1841	22.07	45
France......................	1841	23.97	42
Sweden		24.39	41
Prussia	1840	26.58	38
Austria	1840	29.95	33
Russia......................	1842	35.90	28

Gratifying as it may be to learn that the mortality of England is less than that of other European countries, we must not hastily conclude that, in this country even, public health has reached its climax; or that the mortality of towns, and of unhealthy districts, may not be very materially diminished by sanitary improvements.

The following Table, from the appendix to the Registrar-General's third annual report, offers the following remarkable contrast between the relative mortality of the town and country districts:—

TABLE IV.

	Area in sq. miles.	Population estimated Jan. 1, 1839.	Deaths in Two Years.	Inhabitants to 1 square mile.	Annual Mortality.
Country Districts	17.254	3,559,323	129.628	.206	1 in 54.91
Town ditto	.747	3,769,002	197.474	5.045	1 .. 38.16
England and Wales	57.805			.265	1 .. 45.00

The above method of comparing the mortality in the same number of town and country population, shows at once, the excess in town over country districts, that excess being fairly attributable to the poisonous nature of the air breathed by the inhabitants of towns. There is not only a great variation in the proportion of the mortality of rural and town districts, but considerable differences may be noticed on comparing one county with another. Thus the deaths are, in Surrey 1 to 55 living persons, Sussex 1 to 54, Hertfordshire 1 to 51, Cheshire 1 to 43, and Lancashire 1 to 37. The same disproportion exists in the mortality of cities and towns. For instance, the deaths are, in London 1 to 39 living, Birmingham 1 to 37, Leeds 1 to 37, Bristol 1 to 32, Manchester 1 to 30, Liverpool parish 1 to 29, Chichester 1 to 43, and Bedford 1 to 43, excluding the deaths in the public institutions, or 1 to 37 including these. Here again, it will be observed, that the comparison is not favourable to Bedford, inasmuch as, compared with the average of all England, the proportion of the living to each death is 43 in the former, and 45 in the latter. With the counties, the comparison is also unfavourable to Bedford, and with the large cities and towns, if we take the calculation which retains the mortality in the public institutions (as we ought to do in this comparison, because the same mode of calculation has been adopted with each of the other large cities and towns), we find Bedford more unhealthy than London in the proportion of 37 and 39 living to 1 death, precisely equal with Birmingham and Leeds, and superior in healthiness to Bristol, Manchester, and Liverpool.

Of the excessive mortality proved by the foregoing figures, a small proportion consists of deaths during childhood. The mortality of children under five years of age in Bedford, during sixteen years, has been 1445, or at the rate of 42 per cent.; whereas in the neighbouring villages, the deaths under five years have been 1164, or at the rate of 39.9 per cent. Here is an excess of 70 deaths under five years of age, fairly attributable to the deleterious agents which abound in the town district. Children are remarkably susceptible to all the injurious agents which tend to shorten life, and when such agents exist in full force, the mortality in early life becomes excessive. In Manchester, for instance, which presents the low mean age at death of 18 years only, it is calculated that one-half of all the children die before they reach the age of five years. In country districts the infantile mortality is much less. It is calculated that of 1000 born in agricultural districts, 221 will die under five years of age, shewing a mortality less by half than that of Manchester. One-fourth of all the children born in England die before they reach their fifth birthday,

"An unripe harvest for the scythe of death."

Surely this fact alone is sufficient to demand the sympathy and effort of every parent in behalf of sanitary reform.

In some of the healthiest districts of England, the mortality of children under twelve years of age has been only 1 in 10 or 1 in 12, or as low as 1 in 14. In some towns in Devonshire it has been as low as 1 in 17. Now, granting that in Bedford, as everywhere, many deaths of children are the results of mismanagement, errors in diet, clothing, &c., still a large proportion must be fairly ascribed to the impure state of our atmosphere.

Again, with regard to old age, if we look at the number of deaths of old persons, we find that it forms a larger proportionate item of mortality in our neighbouring villages than in our town. In Bedford, for example, the number of deaths of persons upwards of sixty years of age, during sixteen years, was 1161, or at the rate of 25.9 per cent, whereas in the neighbouring villages the number was 971, or at the rate of 33.3 per cent.

While upon the subject of age, I would direct the reader's attention to one remarkable fact, namely, that during sixteen years there died, in Bedford, 1248 persons between the ages of 30 and 60 years, or at the rate of 27.6 per cent. During the same period, 576 persons died in the neigbouring villages, at the same ages, or at the rate of 19.7 per cent. This calculation shows a very large excess of persons who are cut off from our town population in the very prime of life.

A little reflection will lead us to infer, what proves to be the fact, that towns are the chosen abode of diseases classed under the head of zymotic,* or epidemic, endemic, and contagious, which include small-pox, measles, scarlet-fever, hooping-cough, croup, thrush, diarrhœa, dysentery, cholera, influenza, ague, remittent-fever, typhus, and erysipelas; all of them owing, if not their origin, at least their rapid diffusion, to a vitiated atmosphere. Of this class there were deaths in England—

In 1838	67,877
1839	65,343
1840	76,066
1841	63,148
1842	64,295

The excess of mortality from diseases of the zymotic class in towns is seen at a glance by putting side by side the deaths from zymotic and a few other diseases, occurring in an equal number of town and country population.

TABLE V.

Of 1,000,000 Living there are Deaths in the From	Country.	Town.	Excess.
Small-pox	500	1000	500
Measles	360	900	550
Scarlet-fever	500	1000	500
Typhus	1000	1250	250
Hooping-cough	400	800	400
Teething	120	620	500
Convulsions	850	2000	1150
Hydrocephalus	330	880	550
Scrofula and Consumption	3800	4600	800
Total	7850	13050	5200

The last column shows the excess of mortality in the town over that in the country, or in other words the waste of life caused by the neglect of sanitary regulations just where they are the most required—in densely populated localities.

The above table points out the greater prevalence of these diseases in certain localities over others, it does not show the total and absolute waste of life. Compared with cities and towns the rural districts are much healthier; but they are by no means as healthy as they might be, and as they would be, were proper sanitary measures enforced. On looking into this subject we have been particularly struck with the unhealthiness of some of our villages, the per centage of mortality of which is higher than that of Bedford (deducting the deaths in the public institutions, of persons not belonging to the town), and the sanitary condition of which is most deplorable if compared with that of rural villages in healthy districts.

---

* The term Zymotic (from *ζυμοω* to ferment, *zymosis*, fermentation) is applied to designate that class of diseases which are conceived to owe their origin to causes which act upon the system in a manner analogous to the action of yeast upon the gluten of flour; (not that there is any evidence that this is a real operation, but the idea may be admitted as a convenient means of classification); the class includes the diseases usually considered to be epidemic, endemic, or contagious.

Unhealthy as is Bedford compared with the rural districts generally, there can be no doubt that it is surrounded by some decidedly unhealthy rural parishes. Several might be mentioned but one will suffice—the village of Cople—since it has attained an unenviable notoriety as a haunt of typhus fever. In this place the mortality, during the last sixteen years, has averaged 23 per thousand, the average of an unhealthy town! We mention it because there cannot be many places found where the causes of excessive mortality have been more patent than in Cople. Happily a great sanitary improvement was effected in this place four years ago, and there have been no deaths from fever since. Let this encouraging fact stimulate other landed proprietors to follow the noble example of His Grace the Duke of Bedford.*

By far the largest item in the list of zymotic diseases is typhus-fever; and on reference to the Tables lately presented to the Board of Guardians, it will be seen that Bedford has been visited with more than its *natural and proper* share of this pestilent disease. Typhus-fever chooses its victims from adult age and the prime of life, when the bodily and mental powers are most highly developed. At the age when artizans and labourers are best able to fulfil their respective duties to society, and the mother's attention is indispensable to the welfare of her family, this great plague sweeps them to the grave, and at the same time too frequently consigns a young family to poverty and the workhouse. This excessive mortality from fever will partly account for the fact which has been before referred to (page 8), that in Bedford, as compared with the rural districts, a larger proportion of deaths occur between the ages of 30 and 60 years, in the prime of life.

The annual mortality in England and Wales from the preventible causes of typhus fever alone is double the amount of the slaughter which was sustained by the allied armies in the battle of Waterloo. Bedford has contributed a large quota towards this amount of annual slaughter, for it is a fact that 60 persons have died in this town from fever in one year, and if we regard the bare effects of this mortality alone, such a fact is truly lamentable. But there are other considerations which must press themselves upon our minds. If so many *deaths* occurred from fever in our town in one year, how many cases of illness, not proving fatal, but attended with loss of time and money, must have existed! It has been variously computed that for every case of death there must be a proportion of from 20 to 40 cases of illness. Let us take the lowest calculation mentioned by the most moderate sanitary authorities, namely, 20 cases of sickness to one preventible death, and there will have been an excess of 1140 cases of illness annually in Bedford, more than if it were as healthy as some of the villages around it. *There would have been an annual saving of* 1140 *cases of unnecessary sickness with all their attendant expenses and miseries, in addition to an annual saving of* 57 *lives, with all the attendant distress and anguish, if the mortality of Bedford had been reduced from* 22.6 *to* 17 *per thousand, in other words, if its mortality were not higher than that of the villages mentioned at page* 5. The records of our poor-house, and the experience of our relieving officers will bear me out when I state, that a great proportion of the relief required by the poor (except by the aged) is rendered necessary by sickness. Pauper sickness is a great and constant source of expense to the rate-payers of this country. How many cases of sickness, as well as of death are caused unnecessarily; and how many paupers are made by this sickness and death, it is fearful to contemplate. Reduce the sickness and mortality, and you not only prevent a distressing amount of private misery, but you relieve the public burdens. Every improvement in public health is so much pecuniary saving to the rate-payers, and every outlay with this object is true economy. The effects of so many deaths and cases of illness on the poor rates; the numbers of widows and orphans left on the hands of public charity;—these and other consequences of our excess of mortality are indeed very serious topics of consideration.

---

* See the *Leisure Hour*, No. 85, and the *Bedford Mercury*, August 20th, 1853.

Cases of consumption form a large proportion of the deaths in Bedford. It is true that many of these have occurred in the Infirmary, but when they have all been correctly deducted, we still find a large number left, strictly belonging to the several parishes in Bedford. In the four parishes of St. Paul, St. Peter, St. Cuthbert, and St. John, we had not fewer than 638 deaths from consumption, during sixteen years. Sir James Clark regards "the respiration of a deteriorated atmosphere as one of the most powerful causes of tuberculous cachexia," and adds "there can be no doubt that the habitual respiration of the air of ill-ventilated and gloomy alleys in large towns is a powerful means of augmenting the hereditary disposition to scrofula, and even inducing such a disposition *de novo*." Numerous cases of consumption occur as consequences of fevers and other diseases. Patients recover from fever; but often, not before it has planted in their constitutions the seeds of mortal disease.

Like pulmonary consumption in their relation to atmospheric causes, we find the class of diseases of infancy—difficult dentition, convulsions, hooping-cough, and some others coming under the term scrofulous; such as rickets, water in the brain, mesenteric disease, &c.,; either occasioned or most seriously aggravated by respiration of damp and contaminated air. These diseases contribute largely to the mortality of Bedford.

The facts already given fully support us in the following conclusions:

1. That the mortality of Bedford is high in comparison with many other towns not more favourably situated. The mortality of Bedford is, however, considerably greater than that of many other places; the mortality of Kidderminster, for example, being barely 1 to 49, of Yarmouth 1 to 51, and of Huddersfield 1 to 52; and there are no less than thirty towns of various sizes whose mortality does not exceed 1 to 50.

All men who have paid serious attention to the great question of public health, agree in opinion, that the mortality of the whole country can by proper sanitary regulations be reduced to 2 per cent or 1 to 50 inhabitants. There is no valid reason why Bedford should not reach to the standard of health calculated for all England and Wales, a standard already enjoyed, and in some instances surpassed by the towns already named. We must remember that the *natural* climate, soil, and situation of our town are *not* unfavourable to health and longevity. The population, generally speaking, is not employed in manufactories, &c., injurious to health, nor are its poor buried in cellars. The question, "What are the *causes* of our high rate of mortality?" we will endeavour to answer in our next section.

2. That the annual mortality of Bedford, in proportion to the population, is much greater than in the surrounding rural districts.

3. That the proportion of deaths in early childhood to the total mortality is greater than in the rural districts.

4. That the proportion of deaths above the age of sixty years is much less than in the rural districts.

5. That the proportion of deaths between the ages of thirty and sixty years is much larger than in the rural districts.

6. That the proportion of deaths from the zymotic class of diseases is considerably higher than in the rural districts.

"Devouring pestilence hangs in our air."—SHAKSPERE.

CAUSES.

SUCH are the facts of the case, and now we come to the question, "What are the *causes* of the high rate of mortality in Bedford?"

As we have already said, we have no strong grounds of complaint against the natural circumstances and situation of the town. It is true that it would have been better had our ancestors seen the advantages of the slope on the north as a site for the town; but as it is, Bedford is not *naturally* more unfavourably situated for drainage and consequent dryness of the soil and the atmosphere than many other towns which have a far higher sanitary character. The river *naturally* has a considerable fall at Bedford and *ought* to run at a lively pace past the town, as, without doubt it did in old times, when the monks selected Newnham as a pleasant site for an abbey. Let it be noticed, however, that while we acquit the *natural* river Ouse of blame on the score of the mortality in Bedford, we can by no means pronounce the same favourable verdict on the actual river, or rather say, mass of half stagnant water, which now stretches itself—not flowing but only lazily wallowing to and fro—between our bridge and the site of the old mill at Newnham. So far are we from regarding this "fine piece of water," (as amateurs of boating say) with favour, that one of our objects in following the tables of mortality of this borough with a few remarks on its sanitary condition, is to suggest the question, "Can anything really satisfactory be done for the drainage and general purification of Bedford, while a large body of water in a great measure stopped in its course, extends through the centre of the town?" or in plainer terms, "Can Bedford, in its soil and atmosphere, ever be made sufficiently dry and healthy, while any mill so near to the town is allowed to hold up the water of the Ouse?" We now turn to consider the special causes of preventible mortality.

It has been proved by facts too numerous to leave any room for doubt that,—*cæteris paribus*— the rate of mortality is highest (and of course disease is most prevalent) in those towns and those parts of towns where deficiency of drainage, ventilation, and other necessary means of health are observed. This requires no argument. Proofs are only too abundant. The fact that pollution of the atmosphere we breathe, or of the water we drink, induces fevers and other diseases, is just as certain as that other poisons injure health and cause death. In our deficient drainage and ventilation, our deficient supply of pure water, our dirty and crowded courts, cesspools, pig-styes, open ditches, slaughter-houses, unpaved streets, &c., &c., we find the special causes of our extra rates of mortality. Sixty deaths from fever have occurred in the Bedford parishes within one year; and any one who has inspected our worst localities—Gravel Lane, Allhallows Lane, White Horse Street, Beauchamp Row, Hawes Street, Diamond Alley, Waterloo, Pepper Alley, Bell Court, &c., &c.,—need not wonder at the spread of fever or the inroads of cholera in such places. Several of these localities you will recollect the cholera chose, with unerring instinct, in the years 1832 and 1849. The drainage of the town is very defective. Our largest main sewer passes down Gwyn Street; along the High Street there is no main sewer, and the drainage is very imperfect. House draining, except for dwellings of the better class, is generally very deficient throughout Bedford. It has been proved that cesspools and dung pits are a great source of the contamination of the water of neighbouring springs. Water percolating through the stagnant mass, often permeates the soil and then drains into wells and springs. In this way, too, more than in the deterioration of the atmosphere, are intra-mural burial-grounds so prejudicial to public health. Cesspools and similar nuisances, close to houses, are found in all quarters of our town. Many of our streets are so ill pitched and flagged, that pools of water abound in rainy weather, and mud makes some parts almost impassable in long-continued rain. Many of the cottages, even of recent construction, are ill arranged for ventilation. Some of them are built back to back. An arrangement too commonly found is the entrance to a bed-room with a window close to it, but no fire-place, so that the room is a *cul-de-sac* with no possibility of a thorough ventilation, even when the window is opened. Slaughter-houses, with the most offensive stench, and pig-styes, must also be noticed amongst our nuisances.

On the whole, we are compelled to say that Bedford is in a very filthy condition,—that its sewerage and drainage are not sufficient for the health of the people,—that cesspools and other receptacles of refuse are allowed to remain as very serious nuisances,—that the surface of many streets is left in a very dirty state,—that many of our courts and alleys are close and narrow,—that numerous cottages have been so built as to be deprived of sufficient light and ventilation,—and that our supply of pure water is deficient in several parts of the town. That such causes are sufficient to explain our high rate of mortality, especially with regard to the diseases most prevalent in Bedford—consumption, fever, infantile diseases, &c.,—is unquestioned by all who are competent to judge.

"I would hope that you will learn to esteem those your friends, who, instead of driving you into a course of fruitless agitation on highly doubtful questions of politics or political economy, with a view to their own advantage, would teach you to aim at, and help you to secure, each within your own homes, the elements of health and long life, and the almost indispensable pre-requisites for the exercise of Christian virtue, and the enjoyment of Christian happiness."—REV. C. GIRDLESTONE.

REMEDIES.

THE *causes* having been thus stated, the remedies immediately suggest themselves.

If we would reduce the mortality of Bedford, we must *cleanse* the town. Deterioration of the air we breathe is the great evil against which we have to contend. As it affects all classes, its removal should interest all classes. If a polluted atmosphere could be locally confined in certain courts and alleys; then, though benevolence might lead us to interfere, self-interest might leave the evil uncared for; but both benevolence and rational self-interest combine to urge us to a sanitary reformation. Whatever may be our distinctions of class, we must all breathe a common air, and the damp and noisome atmosphere, which produces fever in the crowded cottage, is not shut in there: it spreads and contaminates, in some degree, the air respired in more favoured localities. Thus the rich man's drawing-room may be affected by the not far distant filthy court or alley, and the

> "Foul and pestilential congregation of vapours,"

hovering over the worst part of St. Giles', may be wafted to the mansions of Belgravia. In this case benevolence is necessarily united with the common instinct of self-preservation. To take care of ourselves, we *must* take care of one another. The most selfish individual cannot improve the sanitary condition of his own premises without doing good to his neighbour, and moreover, he will vainly improve his own premises if he leaves the surrounding neighbourhood in an unwholesome condition. The man who wishes to protect himself from disease, but cares not for his neighbour, should dwell in a lone house in the middle of a wood, or in some such secluded place, for he cannot safely carry out his plan in a town.

If we would enjoy the average longevity of the inhabitants of Great Britain; still more, if we would emulate the most favoured districts; if we would avoid the loss of time, the poverty, and the general misery attendant on the great amount of preventible diseases;—*we must cleanse Bedford.* In the first place, the drainage must be made sufficient. It is vain to move nuisances from one locality of the town to another, or to deposit them just outside of the town; and positively worse than vain to put them into the river. Refuse matters must be carried away, and must be used to fertilize the soil; and this cannot be done without a thorough re-construction and re-organization of our sewers. By throwing our refuse into the river, it circulates through other towns and villages, exerting a poisonous influence wherever it goes. It is time that we were no longer guilty of the absurdity of sending our ships so far, and of paying so high a price for guano, while we are throwing away at home matter of the most fertilizing quality. There can be no encouragement to local sanitary efforts in removing cesspools, cleansing courts, ventilating cottages, &c., without a thorough and good system of drainage, for on this the success of all minor measures must depend.

The *cost* of a sanitary reform is the objection most readily anticipated; but have those parties who would urge this objection duly counted the cost of preventible diseases and deaths? Let us consider it fairly in an economical point of view, and especially with regard to the largest portion of the community—the working classes. Of these, health and time are the chief wealth. All cry out on the enormity, when some poor man is robbed of a few shillings, or perhaps a few pounds—all that he possessed; but a fever may rob the poor man to the extent of time worth many shillings—aye, many pounds, to say nothing of bad consequences that may last for life. The money lost and expended in sixty cases of preventible fever (such as have occurred in one year in our town), would go a great way in paying for drainage. Let every one who would grudge to pay a few shillings for sanitary reform study the cost of ten or twelve weeks of typhus-fever. Time is money, and health is money. Loss of health (to say nothing here of its other miseries,) is loss of time, and, of course, loss of money. The arrangements most conducive to health are cheapest in the long run. There have been 912 more deaths in Bedford, during the last sixteen years, than there would have been, had the mortality been no higher than in some of the neighbouring villages, and, assuming as the lowest calculation, that for every death there have been *twenty* cases of preventible illness, there must have been a very heavy expenditure on disease. The cost to the working man of those conveniences which are conducive to health would be very little more than what he now pays for very inefficient and unsanitary arrangements. With a good system of sewerage, with privies and cesspools prohibited, and superseded by water-closets and soil-pans, with drains running into sufficiently large sewers,—with these and other necessary reforms, the rental of the cottage must be slightly raised, but in a degree quite insignificant when balanced against the great advantages of such reforms.

While so much remains to be done, it is pleasant to remark that one grand improvement of our town is already commenced, by the unanimous determination to close the old burial grounds within the town, and to establish a general cemetery in a convenient and suitable locality, at a proper distance from dwelling-houses.

Another sanitary regulation—the Vaccination Extension Act—must be briefly noticed. It will be remarked that, in several places during the last sixteen years, some portion of the mortality is the result of that disease, small-pox, for which the immortal Jenner, sixty years ago, discovered a sure preventive! Already in countries where vaccination is made compulsory (Sweden, for example), the disease formerly so distructive has been almost entirely eradicated. Let every parent readily comply with the requirements of this beneficent measure, and very soon small-pox will be numbered among matters of past history. The fact, that, after all that has been done by vaccination, there are many parents who refuse to use it—that there still remains a considerable portion of our population who, if allowed without remonstrance and advice to take their own way, would bring back to our towns and villages the former horrors of small-pox;—this fact, we say, is a sufficient proof that, in sanitary measures, some people must not be left to take care of themselves. Even granting such a monstrous assertion as that the head of a family may wilfully expose himself and his children to contagion—has he a right, or ought he to have the liberty, to spread contagion, disease, and death, among his neighbours? If so, tell us, ye logicians on "liberty," why may he not fire a loaded gun into his neighbour's house? If government must not interfere in such a case, pray define for us the office of a government!

Bedford is fortunate in having a Board of Guardians ever active for the welfare of the poor committed to their charge. A few months ago a "Report of the Proceedings of the Board of Guardians, under the 'Nuisances Removal Act and Diseases Prevention Act of 1848,'" was published, shewing that, although much has been done, much remains to be done; that our village parishes are still low in their sanitary condition. The rural parishes will be mostly left under the care of the Board of Guardians and landed proprietors, and it is most desirable that the labours and responsibility of our public bodies should be lightened in the town by the adoption of the Health of Towns' Act, which is urgently required to meet the case of Bedford as already described.

Are proofs required of the good effects of attention to the sanitary arrangements which have been alluded to? Happily they are at hand, and of the most unmistakeable and convincing character. Read "Results of Sanitary Improvement" and you will find that an Association was formed some years ago for improving the dwellings of the industrious and labouring classes. These improved dwellings for the poor have been occupied between five and six years; during the first year there was a decided diminution in the comparative mortality of the residents, both adults and infants; this diminution was still more marked in the second and third years; the improvement has been steadily progressing up to the present time; and now the results so far exceed reasonable expectation, as to be almost beyond belief. Yet they rest on the clearest evidence of facts.

"In the Metropolitan Buildings, Old Pancras Road, for example (which contains a population of 680), the deaths during the last year have been 9, being in the proportion of 13 and a fraction out of 1000 of the living; but the total population of the whole of the society's establishments taken together, amounts to 1,343, out of which number there have been only 10 deaths, being at the rate of 7 and a fraction in 1000. The total deaths in the whole of the Metropolis reached, during the same period, 22 and a fraction in 1000; so that the total mortality in London was three times greater in proportion, than in these establishments. It appears further, that of the total population (1,343) *490 are children under* 10 years of age. Of these 5 have died, being an infant mortality of 10 in 1000; whereas on an average of 7 years the infant mortality in the whole of London has been 52 in 1000, so that the infant mortality in these establishments has not been so much as one fifth that in London generally.

A result even more remarkable now presents itself. In London, the average deaths from typhus and other forms of fever amount to about 12 per cent, of the total deaths.

Typhus fever is not the disease of the young, the weak, or the destitute; on the contrary, it is pre-eminently the disease of the adult, the well nourished, and the strong. It is the destroyer of parents—not of children; and is thus one of the great causes of orphanage, and of consequent pauperism. It has its source in no want of food or clothing; in no condition natural to this climate; in no habits peculiar to the people;—one single word comprehends its main condition, *filth*; and the main source of this filth is the poison-pit, the cess-pool. But the dwellings under the Association of which we speak have been provided with efficient drainage, and a good supply of water, while the cesspools have been removed; and the result is, that there has not been a single death from fever in any one of them since they were first opened; and that a barrier has been placed around them which this mortal pest of our towns and cities has not been able to pass.

The experience of the kindred establishment, over which Lord Shaftesbury presides, is of the same encouraging character."

"The Cholera, instead of being a mysterious visitation, whose origin and mode of propagation is hidden in obscurity, is the result of known physical conditions which are subject to human control."—Laws of Cholera, reprinted from "the Times."

"Dirt, Disease, and Crime are concurrent."

CONCLUSION.

The sanitary state of Bedford has now been described, not as a matter of opinion, but by "stubborn" facts and tables of mortality. Bedford is not so healthy as it ought to be, and might be. A great expenditure is here annually caused by preventible diseases and death. Persons residing in our town, especially those dwelling in its most crowded and dirty localities, incur a risk of loss of life and health greatly above the average liability to disease of persons residing in the more salubrious towns and villages of England. Such are the evils. The remedies have been partly suggested:—good drainage and free ventilation must be secured; cesspools and similar nuisances must be removed; something must be done for the regulation of lodging-houses —the resort of tramps, who often bring contagious diseases into the neighbourhood; wash-houses must be provided for the poor; improvements must be carried out in the cottages and conveniences for the poor; or if these and other similar reforms are not carried into effect, we must expend the money unwisely spared by the rejection of sanitary measures in poor-rates, medicines, and funerals.

It remains with you, the rate-payers and owners of property in Bedford, to decide whether you will vote for cleanliness and health, or for dirt and disease, and we may add, for crime, for they are all concurrent. Shall the provisions of the Public Health Act, for applying the refuse of your habitations to its proper, natural use, in fields and gardens, be carried into effect? or must that which, in its right place, should add fertility to the soil, still lie around your dwellings, and produce only disease, suffering, and death? This beneficent measure—the Public Health Act—contains all, and far more than all the provisions for the improvement of towns to be found in the best Acts passed specially for this purpose. It provides for the abolition of cesspools, and the formation of good sewers; for supplying pure water; regulating the rendezvous of tramps; and generally for the removal of whatever is prejudicial to the public health. Its powers are vested in the hands of a local board, elected by the rate-payers, and the rates are levied in the least oppressive manner possible. Tenants paying less than £10 a year rent are not directly called upon, the owners of property being in such cases liable, and the owners of cottage property have thirty years to pay, by annual instalments, any private improvement-rate with which they may be charged. So that on the whole, as no Act of Parliament can be of more importance to the poor than this, none has ever been framed with more consideration for his circumstances. It is essentially the poor man's Act of Parliament, for it is directly and specially contributory to *his* health and comfort; but let it not be overlooked, that it is also contributory to the health of his richer neighbours.

Remember, the cholera has twice visited us, and, too probably, will again appear in Bedford during the ensuing year. Shall we prepare to meet it, or rather to prevent it? or shall we let it find us helplessly exposed to its ravages? Pray notice what has been done in Exeter—a most encouraging example! In 1832, when that city was in a deplorably unsanitary condition, it was heavily visited by cholera. After that time, sanitary improvements were diligently and efficiently made, and with what result? In 1848-9, when cholera again passed through the length and breadth of England, Exeter was very slightly visited. The details are well given in Dr. Shapter's work on "Sanitary Measures and their Results," in which he clearly shows that this comparative immunity was, under Divine Providence, the result of human agency. This is, indeed, very different from the presbyterian view of the subject; but it is an unquestionable fact, and serves to confirm the sound old proverb, "Heaven helps those that help themselves."

Let not the proposed measures of remedy for a common evil be treated as a party question. We have not to deal with any party question or class interest; but with a simple question of comparative expenditure, on *diseases* and *deaths* on the one side and on *sanitary reform* on the other. If you say reforms are expensive, have I not proved that nuisances are expensive? You *must* pay for the *continuance* of nuisances, if you refuse to pay for their *removal.* Many mistakes have been made in the application of the terms "friends of the people;" but of all these mistakes one of the greatest must be the application of such terms to parties who would leave the poor uncared for in circumstances proved to be conducive to disease, poverty, domestic misery, and untimely death. If it be kindness to leave the poor man, who cannot help himself, with his wife and family surrounded by malaria rising from filth and liable to be *poisoned* (that is the plain fact) by foul air, then it is a sort of "killing kindness," and if this be the course adopted by so called "friends of the people," then "save me from my friends!"

Having noticed the objection of *cost*, I may briefly advert to another which would treat compulsory sanitary measures as infringements on the "liberty" of individuals. My friend DR. LIETCH has so happily alluded to this part of the subject (in an address to his fellow townsmen of Keswick) that I cannot do better than quote his precise words. He says:—

> "If a man may not harbour a ferocious bull dog in his alley, is he to keep a noisome ditch running at large there? and, if he may not hold a main of fighting cocks, is he to keep cholera and typhus in his house? For my part, I cannot see if a justice of the peace can stop a man for knocking me down with a bludgeon, why he should not be authorized to interfere to save me from a typhus fever; and if he can prevent boys from endangering the lives of passengers by firing guns on the high roads, why he should not also be enabled to forbid the open sewers and other nuisances which, if not so noisy, are even more dangerous. A railway company pays heavily for the lives and limbs of passengers sacrificed by the neglect or rashness of its officials, should not a town be equally liable for the losses caused by a public violation of the laws of health?"

This—if there is any force left in sound logic—must be quite sufficient to put down the silly outcry about supposed encroachments on personal liberty. Liberty to do mischief to ourselves and others is not the freedom of which Englishmen boast.

To conclude—if any of our readers should suppose that our remarks have been given in a tone of exaggeration, or that we have made too much of the facts of the case, we would respectfully invite them to study the facts as given in the "Report of the Mortality of Bedford," recently presented to the Board of Guardians.

John G. Nall, Printer, High Street, Bedford.